

JUNIOR HIGH MATHEMATICS DEPARTMENT

ALGEBRA I (H)

Contact Information

Philip Stameris
Building Department Leader, Mathematics
R.J. Grey Junior High School
16 Charter Road
Acton, MA 01720
Telephone: (978)264-4700, x3384
E-mail: pstameris@mail.ab.mec.edu

The Department's Educational Philosophy

The study of mathematics will enhance the ability of all students to problem solve and to reason. Through a strong standardized departmental program that emphasizes problem solving, communicating, reasoning and proof, making connections, and using representations, students will develop organizational skills, self-confidence and a positive attitude toward mathematics. Our curriculum matches that of the Massachusetts Mathematics Curriculum Framework, and we are philosophically aligned with the National Council of Teachers of Mathematics Standards.

Guiding Principles

- All students can learn mathematics.
- Mathematical ideas should be explored in ways that stimulate curiosity, create enjoyment of mathematics, and develop depth of understanding.
- Effective mathematics programs focus on problem solving and require teachers who have a deep knowledge of the discipline.
- Technology is an essential tool in a mathematics education, and all students should gain facility in using it where advantageous.
- All students should have a high-quality mathematics program.
- Assessment of student learning in mathematics should take many forms to inform instruction and learning.
- All students should recognize that the techniques of mathematics are reflections of its theory and structure.
- All students should gain facility in applying mathematical skills and concepts.
- All students should understand the role of inductive and deductive reasoning in mathematics and real life situations.

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Course Frequency: Full-year course, five times per week

Credits Offered: Five

Prerequisites: Yearly grade of A- in Grade 7 Level AE or permission of Building Leader for Mathematics

Background to the Curriculum

This course is now using the 2001 edition of the McDougal Littell Algebra I text: Applications Equations Graphs by Larson, Boswell, Kanold, and Stiff. The text is supplemented with designated materials from the 1992 Dolciani Algebra I text and units on matrices and linear programming. The entire text is covered and goes far beyond the Massachusetts State Frameworks recommendations for a first-year Algebra course, as well as the 2000 edition of the National Council of Teachers of Mathematics. The course is, therefore, well aligned with national and state standards. Teachers utilize other materials to enhance and deepen the curriculum content where appropriate and make minor changes after consultation with the BDL.

Core Topics/Questions/Concepts/Skills

Solve real-life problems using algebraic skills and concepts
Create an environment conducive to learning algebra
Stress organizational skills and the need to provide proof of all solutions
Perform operations/simplify expressions
Solving linear and non-linear equations in one variable
Applying algebra to modeling
Operations on polynomials
Graphing linear and non-linear functions
Set theory
Domain, range, and composition of functions
Topics in probability and statistics
Understanding the role of proof
Solving systems of equations and inequalities in more than one variable
Use of irrational and rational numbers in the Pythagorean Theorem

Course-End Learning Objectives

<u>Learning objective</u>	<u>Corresponding state standards, where applicable</u>
1] use tables and graphs to organize real-life data	8.D.02
2] use rates, ratios, and percents to solve real-life problems	8.N.03
3] apply introductory techniques in Probability and Statistics	10.D.01
4] apply the Pythagorean Theorem to real life problems	10.G.05
5] find the distance between and midpoint between two points	10.G.07
6] add, subtract, multiply and divide real numbers and solve real life problems using real numbers	10.N.01
7] apply the distributive property to algebraic expressions and use the distributive property to solve real-life problems	10.N.01
8] use the properties of exponents to evaluate and solve exponential expressions	10.N.01
9] use scientific notation to solve real life problems	10.N.01
10] simplify and evaluate numerical and algebraic expressions with and without exponents	10.N.02
11] write, use, and graph models of exponential growth and decay	10.P.01
12] find exact an appropriate solutions to equations involving real numbers	10.P.02
13] add, subtract, multiply and divide rational expressions	10.P.03
14] add, subtract, multiply and divide polynomials	10.P.03
15] rewrite and evaluate an equation in function form	10.P.04
16] transform radical expressions into simple radical form	10.P.04
17] factor polynomials and solve quadratic polynomials	10.P.05
18] solve quadratic equations algebraically and graphically	10.P.05
19] apply the quadratic formula or complete the square to solve quadratic equations and inequalities	10.P.05
20] solve and graph absolute value equations and inequalities on a number line and coordinate plane	10.P.06
21] graph horizontal and vertical equations	10.P.07
22] graph linear equations and inequalities using slope and y-intercepts	10.P.07
23] use standard form and slope intercept form to solve real life problems	10.P.07
24] identify, use, and apply the discriminant to find the number of solutions of a quadratic equations and real-life problems	10.P.07
25] solve linear equations and inequalities using 1 or more transformations	10.P.07

26] solve literal equations and formulas for one of its variables	10.P.07
27] solve problems using a linear verbal model	10.P.07
28] draw a diagram to help understand real-life problems	10.P.07
29] solve direct and indirect variation problems (joint and comb)	10.P.07
30] represent real numbers on the number line	10.P.07
31] identify a function and represent a function with an input-output table	10.P.07
32] solve systems of equations and inequalities in two variables using graphing, substitution or linear combination	10.P.08
33] apply systems of linear inequalities to real life problems	10.P.08
34] linear programming	10.P.08
35] add and subtract matrices	10.P.explor
36] use sine, cosine, and tangent ratios to solve real life problems	12.G.01
37] add, subtract, multiply and divide radical expressions	12.N.02
38] solve and graph rational equations and functions	12.P.08
39] solve radical equations	12.P.11

Assessment

Students are generally assessed by in-class tests and quizzes, which are administered regularly throughout a marking period. Generally, two quizzes are equivalent to a test. The students' attitude, effort, and quality of homework preparations will also impact their term grade to a small degree. Teachers informally assess students every day by asking pivotal questions, as well as questions involving mechanics or concepts. A standardized midyear examination and final examination are administered to all students in this course in order to assess their long-term retention of the course material.

Technology Learning Objectives Addressed in This Course

(This section is for faculty and administrative reference; students and parents may disregard.)

<u>Course activity: Skills &/or topics taught</u>	<u>Technology standard(s) addressed through this activity</u>
1] Graphing calculators to introduce graphing of linear and polynomial functions 2] Graphing calculators to solve systems of linear equations 3] Graphing calculators to introduce the concept of data analysis and best fit lines	

Materials and Resources

Teachers use other texts for supplementary ideas, “Algebra with Pizzazz” puzzle sheets, and Algebra I by Dolciani for more challenging examples. Graphing calculators are utilized throughout the course to enhance various concepts and skills.